

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) An air refrigerant cooling apparatus comprising:
a motor having a first magnetic bearing and a second magnetic bearing for supporting a shaft;
a compressor; and
an expansion turbine,
wherein said compressor is connected to said shaft and separated from said first magnetic bearing by a first labyrinth,
said expansion turbine is connected to said shaft and separated from said second magnetic bearing by a second labyrinth, and
pressure differences are generated between spaces where said first magnetic bearing and said second magnetic bearing are provided and respective of an inlet of said compressor and an outlet of said expansion turbine by an external pressure outside said motor.
2. (Original) The air refrigerant cooling apparatus according to claim 1, further comprising sensors for detecting a position of said shaft,
wherein said sensors are provided adjacent to said first magnetic bearing and said second magnetic bearing, and
a pressure difference is generated between a space where said sensors are provided and an outside of a casing of said motor by an external pressure outside said motor.
3. (Original) An air refrigerant cooling apparatus comprising:
a motor having a first magnetic bearing and a second magnetic bearing for supporting a shaft;
a compressor;
an expansion turbine; and

a means for generating pressure differences between spaces where said first magnetic bearing and said second magnetic bearing are provided and respective of an inlet of said compressor and an outlet of said expansion turbine,

wherein said compressor is connected to said shaft and separated from said first magnetic bearing by a first labyrinth, and

said expansion turbine is connected to said shaft and separated from said second magnetic bearing by a second labyrinth.

4. (Original) The air refrigerant cooling apparatus according to claim 3, further comprising:
sensors for detecting a position of said shaft, said sensors provided adjacent to said first magnetic bearing and said second magnetic bearing; and a means for generating a pressure difference between a space where said sensors are provided and an outside of a casing of said motor.

5. (currently Amended) An air refrigeration system comprising:

the air refrigerant cooling apparatus according to ~~any one of claims 1 to 4~~ claim 1;

a first heat exchanger;

a second heat exchanger;

a refrigerator;

a filter; and

a fan,

wherein an outlet of said compressor in said air refrigerant cooling apparatus is connected to an inlet of said first heat exchanger,

an outlet of said first heat exchanger is connected to an inlet of said second heat exchanger,

an outlet of said second heat exchanger is connected to an inlet of said expansion turbine in said air refrigerant cooling apparatus,

an outlet of said expansion turbine in said air refrigerant cooling apparatus is connected to an inlet of said refrigerator,

an outlet of said refrigerator is connected to an inlet of said compressor in said air refrigerant cooling apparatus through said second heat exchanger, and
said fan supplies fluid into a casing of said motor through said filter.

6. (Currently Amended) An air refrigeration system comprising:

the air refrigerant cooling apparatus according to ~~any one of claims 1 to 4~~ claim 1;
a first heat exchanger;
a second heat exchanger;
a refrigerator; and
a radiator,
wherein an outlet of said compressor in said air refrigerant cooling apparatus is connected to an inlet of said first heat exchanger,
an outlet of said first heat exchanger is connected to an inlet of said second heat exchanger,
an outlet of said second heat exchanger is connected to an inlet of said expansion turbine in said air refrigerant cooling apparatus,
an outlet of said expansion turbine in said air refrigerant cooling apparatus is connected to an inlet of said refrigerator,
an outlet of said refrigerator is connected to an inlet of said compressor in said air refrigerant cooling apparatus through said second heat exchanger,
said radiator is provided outside said air refrigerant cooling apparatus, and
an inlet and an outlet of said radiator are connected to air vents which are provided on a casing of said motor and associated with respective of said inlet and said outlet of said radiator.

7. (Currently Amended) An air refrigeration system comprising:

the air refrigerant cooling apparatus according to ~~any one of claims 1 to 4~~ claim 1;
a first heat exchanger;
a second heat exchanger; and
a refrigerator,

wherein an outlet of said compressor in said air refrigerant cooling apparatus is connected to an inlet of said first heat exchanger,

an outlet of said first heat exchanger is connected to an inlet of said second heat exchanger,

an outlet of said second heat exchanger is connected to an inlet of said expansion turbine in said air refrigerant cooling apparatus,

an outlet of said expansion turbine in said air refrigerant cooling apparatus is connected to an inlet of said refrigerator,

an outlet of said refrigerator is connected to an inlet of said compressor in said air refrigerant cooling apparatus through said second heat exchanger,

a conduit connected to said outlet of said second heat exchanger is branched for cooling down an inside of said motor,

said branched conduit is connected to an air vent provided on a casing of said motor, and

said inlet of said compressor in said refrigerant cooling apparatus is connected to another air vent provided on said casing.

8. (Currently Amended) A refrigerator container comprising:

the air refrigerant cooling apparatus according to ~~any one of claims 1 to 4~~ claim 1;

a first heat exchanger;

a second heat exchanger;

a container box; and

a radiator,

wherein an outlet of said compressor in said air refrigerant cooling apparatus is connected to an inlet of said first heat exchanger,

an outlet of said first heat exchanger is connected to an inlet of said second heat exchanger,

an outlet of said second heat exchanger is connected to an inlet of said expansion turbine in said air refrigerant cooling apparatus,

an outlet of said expansion turbine in said air refrigerant cooling apparatus is connected to an inlet of said container box,

an outlet of said container box is connected to an inlet of said compressor in said air refrigerant cooling apparatus through said second heat exchanger,

said radiator is provided outside said air refrigerant cooling apparatus for cooling down an inside of said motor in said air refrigerant cooling apparatus, and

an inlet and an outlet of said radiator are connected to air vents which are provided on a casing of said motor and associated with respective of said inlet and said outlet of said radiator, and

said air refrigerant cooling apparatus, said first heat exchanger, said second heat exchanger, said container box, and said radiator are configured to be transportable.

9. (Currently Amended) An air refrigeration system comprising:

a first bearing for supporting a shaft;

a compressing mechanism;

an expansion turbine;

a first heat exchanger;

a second heat exchanger; and

a first conduit,

wherein an outlet of said compressing mechanism ~~in said air refrigerant cooling apparatus~~ is connected to an inlet of said first heat exchanger,

an outlet of said first heat exchanger is connected to an inlet of said second heat exchanger,

an outlet of said second heat exchanger is connected to an inlet of said expansion turbine ~~in said air refrigerant cooling apparatus~~,

an outlet of said expansion turbine ~~in said air refrigerant cooling apparatus~~ is connected to an inlet of said a refrigerator,

an outlet of said refrigerator is connected to an inlet of said compressing mechanism through said second heat exchanger,

a compressor in said compressing mechanism is connected to said shaft and is separated from said first bearing by a first labyrinth,

said expansion turbine is connected to said shaft, and

said first conduit supplies an air refrigerant from between an outlet of said compressor and said inlet of said refrigerator to a space where said first bearing is provided.

10. (Original) The air refrigeration system according to claim 9, further comprising:
a second bearing supporting said shaft at a position closer to said expansion turbine than said compressor; and

a second conduit for supplying said air refrigerant from said space where said first bearing is provided to a space where said second bearing is provided.

11. (Original) The air refrigeration system according to claim 10, further comprising a third conduit for supplying said air refrigerant from said space where said second bearing is provided to said outlet of said expansion turbine.

12. (Currently Amended) The air refrigeration system according to ~~any one of claims 9 to 11~~ claim 9, further comprising a motor for rotating said shaft,
wherein said first bearing and said second bearing are magnetic bearings.

13. (Currently Amended) The air refrigeration system according to ~~any one of claims 9 to 12~~ claim 9,
wherein said first conduit is configured to derive said air refrigerant from said inlet of said expansion turbine.

14. (Currently Amended) The air refrigeration system according to ~~any one of claims 9 to 11~~ claim 9,
said compressing mechanism further includes an auxiliary compressor provided upstream of said compressor.

15. (Currently Amended) A refrigerator container comprising
the air refrigeration system according to ~~any one of claims 9 to 14~~ claim 9; and
a container box connected to said outlet of said expansion turbine.

16. (New) An air refrigeration system comprising:
the air refrigerant cooling apparatus according to claim 2;
a first heat exchanger;
a second heat exchanger;
a refrigerator;
a filter; and
a fan,
wherein an outlet of said compressor in said air refrigerant cooling apparatus is connected to an inlet of said first heat exchanger,
an outlet of said first heat exchanger is connected to an inlet of said second heat exchanger,
an outlet of said second heat exchanger is connected to an inlet of said expansion turbine in said air refrigerant cooling apparatus,
an outlet of said expansion turbine in said air refrigerant cooling apparatus is connected to an inlet of said refrigerator,
an outlet of said refrigerator is connected to an inlet of said compressor in said air refrigerant cooling apparatus through said second heat exchanger, and
said fan supplies fluid into a casing of said motor through said filter.

17. (New) An air refrigeration system comprising:
the air refrigerant cooling apparatus according to claim 2;
a first heat exchanger;
a second heat exchanger;
a refrigerator; and
a radiator,
wherein an outlet of said compressor in said air refrigerant cooling apparatus is connected to an inlet of said first heat exchanger,
an outlet of said first heat exchanger is connected to an inlet of said second heat exchanger,

an outlet of said second heat exchanger is connected to an inlet of said expansion turbine in said air refrigerant cooling apparatus,

an outlet of said expansion turbine in said air refrigerant cooling apparatus is connected to an inlet of said refrigerator,

an outlet of said refrigerator is connected to an inlet of said compressor in said air refrigerant cooling apparatus through said second heat exchanger,

said radiator is provided outside said air refrigerant cooling apparatus, and

an inlet and an outlet of said radiator are connected to air vents which are provided on a casing of said motor and associated with respective of said inlet and said outlet of said radiator.

18. (New) An air refrigeration system comprising:

the air refrigerant cooling apparatus according to claim 2;

a first heat exchanger;

a second heat exchanger; and

a refrigerator,

wherein an outlet of said compressor in said air refrigerant cooling apparatus is connected to an inlet of said first heat exchanger,

an outlet of said first heat exchanger is connected to an inlet of said second heat exchanger,

an outlet of said second heat exchanger is connected to an inlet of said expansion turbine in said air refrigerant cooling apparatus,

an outlet of said expansion turbine in said air refrigerant cooling apparatus is connected to an inlet of said refrigerator,

an outlet of said refrigerator is connected to an inlet of said compressor in said air refrigerant cooling apparatus through said second heat exchanger,

a conduit connected to said outlet of said second heat exchanger is branched for cooling down an inside of said motor,

said branched conduit is connected to an air vent provided on a casing of said motor, and

said inlet of said compressor in said refrigerant cooling apparatus is connected to another air vent provided on said casing.

19. (New) A refrigerator container comprising:

the air refrigerant cooling apparatus according to claim 2;

a first heat exchanger;

a second heat exchanger;

a container box; and

a radiator,

wherein an outlet of said compressor in said air refrigerant cooling apparatus is connected to an inlet of said first heat exchanger,

an outlet of said first heat exchanger is connected to an inlet of said second heat exchanger,

an outlet of said second heat exchanger is connected to an inlet of said expansion turbine in said air refrigerant cooling apparatus,

an outlet of said expansion turbine in said air refrigerant cooling apparatus is connected to an inlet of said container box,

an outlet of said container box is connected to an inlet of said compressor in said air refrigerant cooling apparatus through said second heat exchanger,

said radiator is provided outside said air refrigerant cooling apparatus for cooling down an inside of said motor in said air refrigerant cooling apparatus, and

an inlet and an outlet of said radiator are connected to air vents which are provided on a casing of said motor and associated with respective of said inlet and said outlet of said radiator, and

said air refrigerant cooling apparatus, said first heat exchanger, said second heat exchanger, said container box, and said radiator are configured to be transportable.

20. (New) The air refrigeration system according to claim 10, further comprising a motor for rotating said shaft,

wherein said first bearing and said second bearing are magnetic bearings.

21. (New) The air refrigeration system according to claim 11, further comprising a motor for rotating said shaft,
wherein said first bearing and said second bearing are magnetic bearings.